

ENTOMOLOGY.—A new genus of *Trypetidae* near *Anastrepha* (*Diptera*).¹ ALAN STONE, U. S. Bureau of Entomology and Plant Quarantine.

A study of species heretofore placed in the genus *Anastrepha* has revealed a number that differ rather widely in structure from the genotype. Certain of these belong to the subgenus *Pseudodacus* Hendel, which I believe to be worthy of generic status and which I shall treat in a later paper. The others I place in the genus described in this paper. Eight previously described species and three new ones are included.

Certain terms in this paper may require explanation. The *wing pattern* is considered to consist of three bands, which become somewhat coalescent in certain species, broken or incomplete in others. The *costal band* extends along the anterior margin from the base of the wing to the apex of vein R_1 ; the **S**-band and the **V**-band are as designated by previous writers. The *ovipositor* is a sclerotized, subcylindrical tube with an acute apex, lying in a cylindrical, tapering, *ovipositor sheath*, the seventh abdominal segment. The eighth abdominal segment is membranous, is invaginated into the end of the ovipositor sheath, and bears denticles dorsally which form the *rasper*. Since the abdomen is often bent in mounted specimens, the total length of the body is difficult to determine. For this reason I have used instead, to indicate the size of the species, the length of the mesonotum from its anterior margin to the apex of the scutellum.

The writer is particularly indebted to A. C. Baker, of the Division of Fruitfly Investigations, Bureau of Entomology and Plant Quarantine, who first proposed the segregation of this genus, for specimens of the two new Mexican species; to James Zetek of the same Division for the new species from Panama; to John Smart, of the British Museum, for valuable information on the type of *Trypeta acidusa* Walker; and to A. da Costa Lima, of the Instituto Oswaldo Cruz, Rio de Janeiro, for information on a number of his species.

Lucumaphila, n. gen.

Agreeing in structure and chaetotaxy with *Anastrepha* (type, *Dacus serpentinus* Wiedemann) except for the following: Ovipositor sheath more slender; denticles of rasper usually all minute, long hooks absent, or, if the denticles are longer (0.1 mm), straight with blunt apices, not hook-shaped; ovipositor extremely slender, subcylindrical, the shaft about 0.05 mm or less in diameter; claspers of male rounded apically, the teeth subapical; aedeagus very slender, 1–2 mm long, reaching well beyond apex of claspers but considerably shorter than ovipositor; tip of aedeagus simple, membranous.

¹ Received March 29, 1939.

Genotype.—*Lucumaphila sagittata*, n. sp.

Distribution.—Neotropical Region from the Rio Grande Valley, Tex., to Brazil. The host fruits of only two species are known, both belonging to the genus *Lucuma* of the family Sapotaceae.

The species are medium sized to rather large and predominantly yellow-brown in color. The wing pattern is essentially similar to that found in many species of *Anastrepha* and not reduced or modified as in *Pseudodacus*. The microchaetae usually present on the dorsal surface of the posterior portion of the alula in *Anastrepha* are absent in *Lucumaphila*. All but one species of *Lucumaphila* (*hamadryas*) has, in the female, a distinct, small, dark nodule dorsally on the eighth segment just distad of the end of the ovipositor sheath. Certain species of *Anastrepha* have the ovipositor nearly as slender as in the genus *Lucumaphila*, but in these species it is never both extremely slender and very long and the rasper is always well developed. In *Lucumaphila hamadryas*, new species, the denticles of the rasper are unusually large for the genus, but they are straight and blunt, not curved and tapering as in *Anastrepha*, and they differ only in size from the minute denticles of the other species of *Lucumaphila*. The modified wing pattern and large hooks of the rasper distinguish the females of *Pseudodacus*. The male terminalia in *Lucumaphila* are much as in *Pseudodacus*, but the aedeagus of *Pseudodacus* is always very much reduced, scarcely exceeding the claspers. In those species of *Anastrepha* in which the teeth of the male clasper are subapical, the aedeagus is always much stouter and longer than in *Lucumaphila*.

Within the genus *Lucumaphila* the male terminalia exhibit very few differences, at least in those species known to the writer. The aedeagus is 1 to 2 mm long, the exact measurement being very difficult to make. The distal portion is slightly enlarged, with the apex attenuate and without the sclerotized modifications present in *Anastrepha*. The claspers are very similar in most of the species, but in the three species the males of which are known to me a sclerotized structure at the junction of the claspers, at the point where the anal segment joins the clasper segment ventrally, shows some differences. This structure is figured, but its value can not certainly be determined until more specimens can be studied.

The ovipositor tip is sagittate in several species, but the character is frequently difficult to see because the extracted, mounted ovipositor tends to lie on its side or will turn on its side even after mounting. Also, the ovipositor is so slender and delicate that extracting it without breaking off the tip is difficult.

KEY TO SPECIES

1. Costal and **S**-bands of wing widely separated. 2
- Costal and **S**-bands of wing touching to broadly confluent. 3
2. Ovipositor shaft about 0.025 mm wide, the tip very slender; two brownish spots on posterior margin of mesoscutum; **V**-band broken anteriorly. 1. *luederwaldti* (Costa Lima)
- Ovipositor shaft about 0.05 mm wide, the tip broader, with fine serrations; no dark spot on posterior margin of mesoscutum; **V**-band complete. 2. *hambletoni* (Costa Lima)
3. Bands on apical half of wing broadly confluent and somewhat diffuse; cell *R* completely infuscated. 3. *obscura* (Aldrich)
- V**-band distinct; cell *R* partially hyaline. 4

4. Mesoscutum with two or three distinct black spots on posterior margin 4. *dentata*, n. sp.
 Mesoscutum not spotted with black, although a dark brown band or diffuse brownish spots may be present posteriorly 5
5. Costal and **S**-bands very broadly coalescent along vein R_{4+5} ; the hyaline area in cell *R* greatly reduced; cell *M* infuscated; **V**-band narrowly joined to **S**-band at vein *M* 5. *urichi* (Greene)
 Costal and **S**-bands joined more narrowly along vein R_{4+5} ; the hyaline area in cell *R* larger; cell *M* hyaline; **V**-band separated from **S**-band at vein *M* 6
6. **V**-band separated from **S**-band; denticles of rasper of female rather large, about 0.1 mm long 6. *hamadryas*, n. sp.
 At least proximal arm of **V**-band joined to **S**-band; denticles of rasper of female much smaller 7
7. Distal arm of **V**-band slightly narrower at wing margin than it is near anterior end; hind margin of **S**-band subparallel to proximal margin of inner arm of **V**-band from vein R_{4+5} to fold in cell first M_2 7. *sagittata*, n. sp.
 Distal arm of **V**-band of uniform width, narrowed anteriorly, or greatly reduced, in any case usually disconnected from proximal arm; **S**-band and proximal arm of **V**-band divergent from near their juncture 8
8. Ovipositor sheath 8 mm long; macrochaetae of dorsum of thorax black; vein M_{1+2} but little turned forward at wing margin 8. *longicauda* (Costa Lima)
 Ovipositor sheath less than 7 mm long; macrochaetae of dorsum of thorax orange-brown; vein M_{1+2} with the normal forward curve 9
9. Ovipositor sheath more than 5.5 mm long 9. *hamata* (Loew)
 Ovipositor sheath about 4 mm long 10. *zernyi* (Costa Lima)

Lucumaphila acidusa (Walker) would run to couplet 9 in this key, but since the ovipositor sheath and ovipositor are incomplete it can not be keyed further.

1. *Lucumaphila luederwaldti* (Costa Lima), n. comb.

Anastrepha luederwaldti Costa Lima, Mem. Inst. Oswaldo Cruz 28: 510, figs. 15-16, pl. 66, fig. 18, pl. 76, fig. 67, 1934.

Medium sized, yellow-brown. A pair of castaneous spots on apical margin of mesoscutum; metanotum entirely yellow-brown. Macrochaetae pale yellow. Sternopleural bristle well developed. Wing 7.75 mm long, the costal, **S**-, and **V**-bands all separated and the **V**-band broken anteriorly, neither arm crossing vein R_{4+5} ; vein M_{1+2} only slightly turned forward at apex. *Female*: Body, exclusive of ovipositor sheath, 6.5 mm. Ovipositor sheath 3 mm long, tapering. Ovipositor about 0.025 mm wide, the tip tapering and with no serrations. *Male*: Tip of clasper obtuse, turned slightly caudad, the teeth subapical.

Cotypes.—Two females, two males (Museu Paulista, São Paulo).

Type localities.—São Paulo, Ypiranga, and Alto da Serra, Brazil.

Distribution.—Known only from the foregoing localities, all in southern Brazil.

Remarks.—I have not seen this species, the above description being based upon the original one. The slender ovipositor and character of the rasper make its assignment to this genus rather certain.

2. *Lucumaphila hambletoni* (Costa Lima), n. comb.

Anastrepha hambletoni Costa Lima, Mem. Inst. Oswaldo Cruz 28: 519, fig. 19, pl. 67, fig. 21, 1934.

Medium sized, yellow-brown, the mesoscutum with pale-yellow stripes. Total length, exclusive of ovipositor sheath, 7 mm. Macrochaetae castaneous. Sternopleural bristle present. Wing 7 mm long, the costal, S-, and V-bands all separated; V-band complete; vein R_{2+3} slightly undulant. *Female*: Ovipositor sheath 5 mm long, slender, tapering. Ovipositor long, slender, the shaft about 0.05 mm wide; tip narrowed rather abruptly, with a few fine serrations.

Holotype.—Female (Instituto Oswaldo Cruz, Rio de Janeiro).

Type locality.—Viçosa, State of Minas Geraes, Brazil.

Distribution.—Known only from the single specimen.

Remarks.—I have not seen this species, the above description being based on the original one. The dimensions of the body and wing were not given in the original description but have been furnished me by Dr. Costa Lima.

3. *Lucumaphila obscura* (Aldrich), n. comb.

Anastrepha obscura Aldrich, Proc. U. S. Nat. Mus. 66 (18): 5, 1925.—Greene, Proc. Ent. Soc. Washington 36: 157, pl. 21, fig. 2, 1934.—Costa Lima, Mem. Inst. Oswaldo Cruz 28: 500, 1934.

Large, orange-brown. Mesonotum 4.6 mm long, orange-brown, the mesoscutum with indistinct paler stripes; no black on metanotum. Macrochaetae orange-brown; pile yellow. Sternopleural bristle very weak. Wing (Fig. 10) 10.5 mm long, orange-brown, except for a hyaline triangle on costa beyond stigma and pale spots on posterior margin of wing in cells second M_2 , Cu_1 , and anal, the spot in Cu_1 extending forward faintly to vein R_{4+5} ; in one specimen a fenestrate spot in cell R_{2+3} beyond costal hyaline spot. *Female*: Ovipositor sheath 6.5 mm long, the basal half somewhat swollen, tapering to the slender apical half; spiracles about 1.1 mm from base. Ovipositor 5.5 mm long, very slender, the shaft about 0.035 mm wide, slightly swollen before apex; tip as in figure 1. *Male*: Tip of clasper acute in lateral view. Cephalic view as in figure 7.

Holotype.—Female (U. S. National Museum).

Type locality.—Maraval, Trinidad.

Distribution.—Trinidad and Brazil.

Host plant.—*Lucuma multiflora*.

Remarks.—In addition to the original specimens there is a male from Trinidad, March 5, 1919 (F. W. Ulrich), in the U. S. National Museum and a female from Brazil (H. W. Bates) in the British Museum. The species is easily recognized by its wing pattern.

4. *Lucumaphila dentata*, n. sp.

Medium sized, yellow-brown, with black spots on mesoscutum. Mesonotum 3.58 mm long, pale yellow, the mesoscutum with four orange-brown stripes, the outer pair extending from behind humeri to lateral angles of

scutellum, narrower posteriorly and coalescent with inner pair anteriorly; two inner stripes extending about three-fourths of distance from anterior margin to scutellum and separated by a median line which narrows anteriorly, leaving a transverse, pale-yellow area anterior to scutellum with a median projection to anterior margin of mesonotum and narrow lateral projections, fading out anteriorly; at posterior end of each lateral orange-brown stripe a black spot, concave on inner and anterolateral margins,

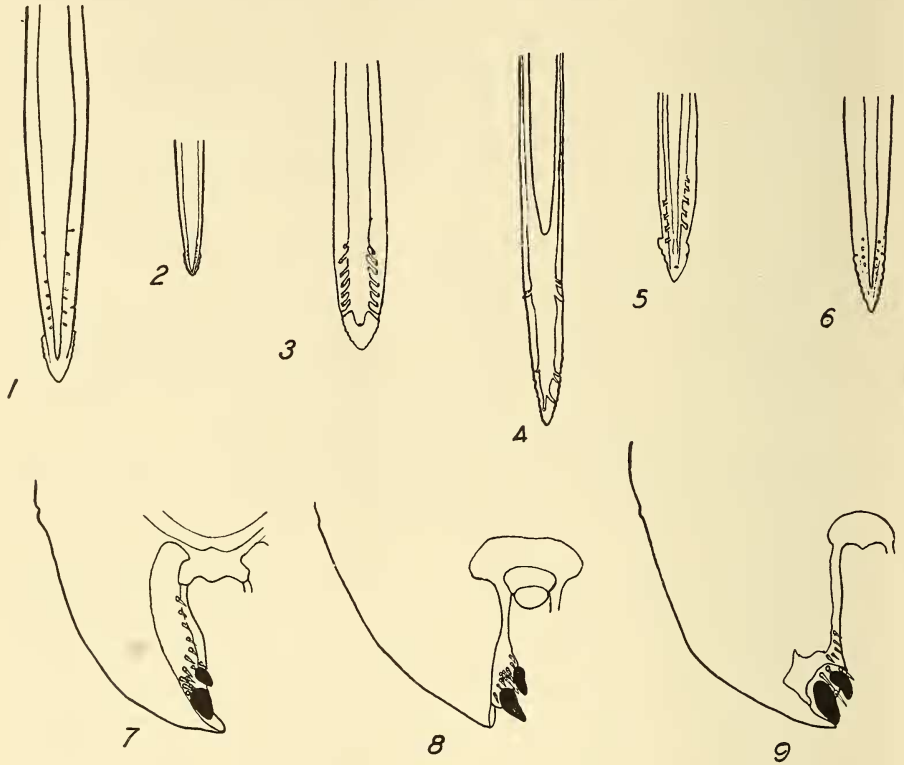


Fig. 1.—Ovipositor tip of *Lucumaphila obscura* (Aldrich). Fig. 2.—Ovipositor tip of *L. dentata*, n. sp. Fig. 3.—Ovipositor tip of *L. urichi* (Greene). Fig. 4.—Ovipositor tip of *L. hamadryas*, n. sp. Fig. 5.—Ovipositor tip of *L. sagittata*, n. sp. Fig. 6.—Ovipositor tip of *L. hamata* (Loew). Fig. 7.—Right male clasper of *L. obscura* (Aldrich). Fig. 8.—Right male clasper of *L. sagittata*, n. sp. Fig. 9.—Right male clasper of *L. hamata* (Loew).

convex on posterolateral margin; holotype and female paratype only faintly brownish on scutoscutellar suture medianly; male paratype with a pronounced brownish-black spot; pleura predominantly pale yellow; metanotum uniformly yellow-brown. Macrochaetae yellow-brown; pile yellow. Sternopleural bristle present, slender. Wing (Fig. 11) 8 mm long, the bands yellow-brown; costal and **S**-bands united a short distance on vein R_{4+5} ; **V**-band complete, joined to **S**-band anteriorly. *Female*: Ovipositor sheath 2.6 mm long, evenly tapering apically; spiracles 0.67 mm from base. Ovipositor very slender, the shaft about 0.0175 mm wide; length unknown, as it is complete in neither female; tip as in Fig. 2. *Male*: Terminalia accidentally lost.

Holotype.—Female. Paratypes, one male, one female (U. S. N. M. no. 51649).

Type locality.—Tequila, Jalisco, Mexico.

Distribution.—Jalisco, Mexico; Texas.

Remarks.—The holotype and male paratype formed part of the material obtained as a result of a trip by A. C. Baker and Alfons Dampf to Tequila in the latter part of July 1934. The name *dentata* is the manuscript name under which Dr. Baker figured the species in an unpublished report, chosen in reference to the toothlike black spots on the mesoscutum. The female paratype was collected at San Juan, Tex., February 20, 1935, by Burl Stugard. The ovipositor sheath of this specimen is the one described, as the sheath of the holotype was not preserved by Dr. Baker.

5. *Lucumaphila urichi* (Greene), n. comb.

Anastrepha urichi Greene, Proc. Ent. Soc. Washington 36: 159, pl. 22, fig. 1, 1934.

Rather large, yellow-brown. Mesonotum 4.39 mm long. Entire thorax uniformly yellow-brown. Macrochaetae orange-brown; pile pale yellowish brown. Sternopleural bristle very weak. Wing (Fig. 12) 9.25 mm long, the venation normal; wing bands orange-brown, the hyaline area between apical portion of **S**-band and distal arm of **V**-band distinctly constricted at vein R_{4+5} ; **V**-band broad, broadly connected with **S**-band anteriorly and narrowly so on vein *M*; costal and **S**-bands broadly coalescent; cell *M* infuscated. *Female*: Ovipositor sheath 4.87 mm long, the apical third distinctly narrower than the posteriorly tapering basal two-thirds; spiracles 1.33 mm from base. Ovipositor 4.25 mm long, extremely slender, the shaft about 0.029 mm wide; tip slightly widened, with the apex rounded and indistinctly serrate (Fig. 3).

Holotype.—Female (U. S. National Museum).

Type locality.—Trinidad.

Distribution.—Known only from the single specimen.

6. *Lucumaphila hamadryas*, n. sp.

Large, yellow-brown. Mesonotum 4.9 mm long. Mesoscutum pale yellow, with four rather indistinct orange stripes, the median pair not reaching to acrostichal bristles posteriorly; a darker orange-brown, transverse band in front of scutellum; scutellum and pleura pale yellow; metanotum orange-yellow. Macrochaetae black; pile pale yellow-orange. No sternopleural bristle. Wing (Fig. 15) 11.5 mm long, the pattern mostly brown, the costal and **S**-bands joined for a short distance on vein R_{4+5} ; **V**-band rather heavy, narrowed but not broken at apex, narrowly separated from **S**-band. *Female*: Ovipositor sheath 6.5 mm long, slender, tapering, the spiracles about 1.34 mm from base. Ovipositor 5.53 mm long, the shaft about 0.035 mm wide, the base abruptly widened, the tip long, slender, with minute serrations apically (Fig. 4).

Holotype.—Female (U. S. N. M. no. 51650).

Type locality.—La Campana, Panama.

Distribution.—Known only from the type specimen.

Remarks.—The type was collected in a glass trap in Muñoz Grove, La Campana, January 7, 1939, by James Zetek, who wrote, "The single large female is the largest *Anastrepha* yet collected by us. . . ." As indicated previously, this species shows certain features of the eighth segment and

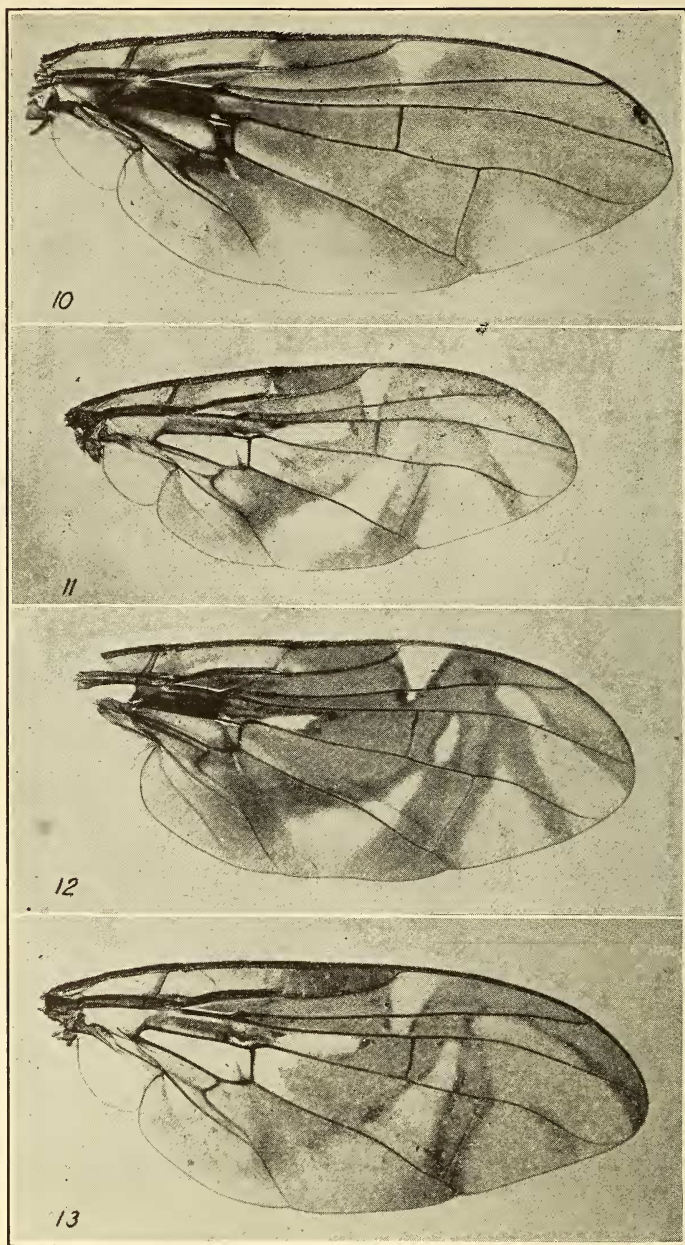


Fig. 10.—Wing of *Lucumaphila obscura* (Aldrich). Fig. 11.—Wing of *L. dentata*, n. sp. Fig. 12.—Wing of *L. urichi* (Greene). Fig. 13.—Wing of *L. hamata* (Loew).

rasper rather different from other species of the genus, but the shape of the rasper denticles and the character of the ovipositor place it in *Lucumaphila*.

7. *Lucumaphila sagittata*, n. sp.

Rather large, predominantly yellow-brown. Mesonotum 4.5 mm long. Mesoscutum orange-yellow, with humerus, a sublateral stripe from transverse suture to scutellum, and an area in front of acrostichal bristles having a narrow median extension anteriorly, pale yellow; a brown transverse band on scutoscutellar suture, most of it anterior to suture; pleura pale yellow; metanotum orange-yellow. Macrochaetae orange-brown; pile pale yellow. No sternopleural bristle. Wing (Fig. 14) 9.9 mm long, the pattern orange-brown, the costal and **S**-bands rather narrowly connected; **V**-band rather narrowly connected to **S**-band; distal arm of **V**-band widest just behind connection with the proximal arm, narrowing to the posterior margin. *Female*: Ovipositor sheath 4.5–5.2 mm long, slender, tapering, slightly curved upward, the spiracles about 1.11 mm from base. Ovipositor 3.9–4.5 mm long, the shaft about 0.028 mm wide; tip scarcely wider than shaft, sagittate (Fig. 5). *Male*: Clasper stout, the apex blunt in lateral view; cephalic view as in Fig. 8.

Holotype.—Female. Paratypes, 15 females, 5 males (U. S. N. M. no. 51651).

Type locality.—Cuernavaca, Mexico.

Distribution.—Texas to Panama.

Host plant.—According to Dr. Baker this species has been reared from the seeds of *Lucuma* in Mexico, but I have seen no reared specimens.

Remarks.—The holotype was trapped at Cuernavaca in September 1933 by M. McPhail; 15 paratypes were trapped at the same locality in September 1933 and November 1934; 4 paratypes were trapped at Mission, Tex., January 6, 1938, by D. O. Sikes; one paratype was trapped at Balboa, Canal Zone, in September 1938 by James Zetek. The name of this species, suggested by the strongly sagittate tip of the ovipositor, is the manuscript name under which Dr. Baker figured and described the species in an unpublished report.

8. *Lucumaphila longicauda* (Costa Lima), n. comb.

Anastrepha longicauda Costa Lima, Mem. Inst. Oswaldo Cruz 28: 525, fig. 23, pl. 48, fig. 25, pl. 74, fig. 53, 1934; O Campo 8: 38, 1937.

Large, yellow-brown. Mesoscutum yellow-brown with no pale stripes; metanotum with two brownish, transverse streaks on each side. Macrochaetae black. No sternopleural bristle. Wing 10.5 mm long, the costal and **S**-bands narrowly touching on vein R_{2+3} ; proximal arm of **V**-band rather broadly joined to **S**-band anteriorly; distal arm slender, separated from proximal arm anteriorly; vein M_{1+2} but little turned forward at apex. *Female*: Body, exclusive of ovipositor sheath 9.5 mm long. Ovipositor sheath 8 mm long, slender. Ovipositor about 6.9 mm long, very slender, the shaft about 0.04 mm in diameter; the tip is figured by Costa Lima as being no wider than the shaft, without teeth or processes, but it is probable that the view is a lateral one.

Holotype.—Female (Instituto Oswaldo Cruz).

Type locality.—S. Gabriel, Rio Negro, Amazonas, Brazil.

Distribution.—Known only from the type specimen.

Remarks.—The above description is based upon the original description, since I have not seen the species.

9. *Lucumaphila zernyi* (Costa Lima), n. comb.

Dacus parallelus Wiedemann (part), *Aussereuropaische zweifflugelige Insecten* 2: 515, 1830.

Anastrepha zernyi Costa Lima, *Mem. Inst. Oswaldo Cruz* 28: 425, pl. 62 fig. 2-3, 1934; *O Campo* 8: 38, 1937.

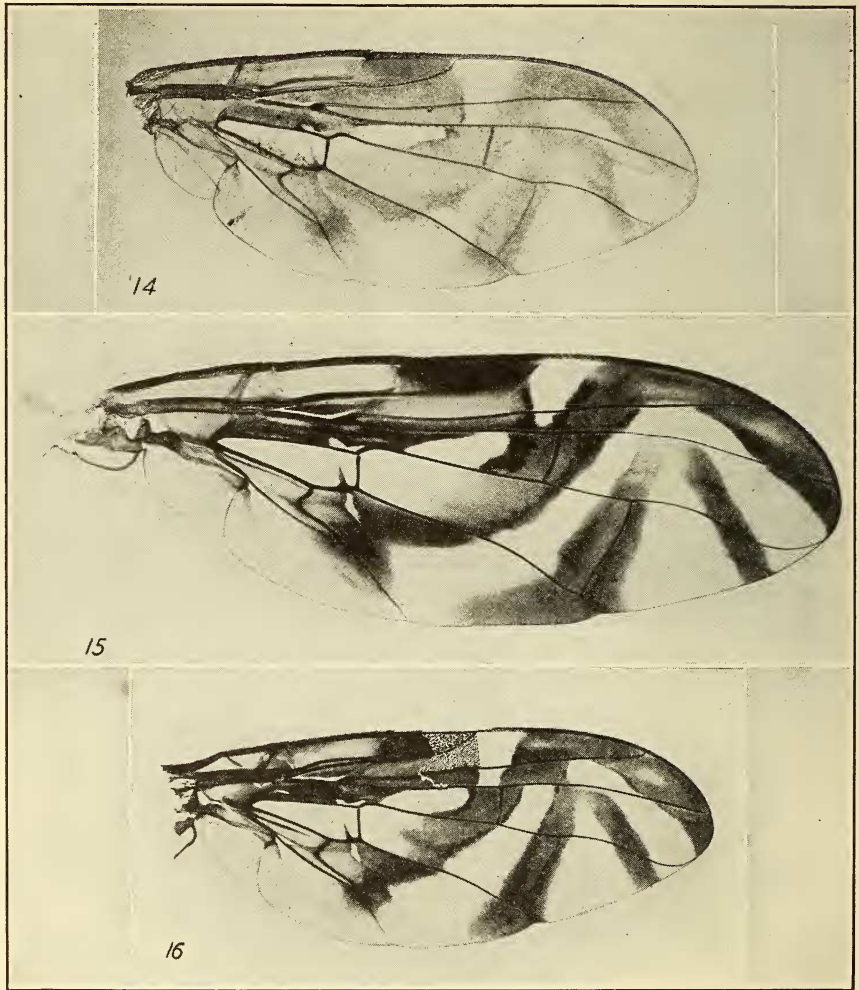


Fig. 14.—Wing of *Lucumaphila sagittata*, n. sp. Fig. 15.—Wing of *L. hamadruas* n. sp. Fig. 16.—Wing of *L. acidusa* (Walker) (photo by John Smart).

Rather large, yellow-brown. Mesonotum 3.9 mm. long. Thorax yellow-brown, a small brownish spot on mesoscutum just anterior to corner of scutellum. Macrochaetae orange-brown; pile yellowish brown. Sternopleural bristle slender. Wing 8.5 mm long, the bands yellow-brown; costal and S-bands narrowly touching; proximal arm of V-band rather broadly joined to S-band anteriorly. *Female*: Ovipositor sheath 4 mm long, slender, the

spiracles 0.97 mm from base. Tip of ovipositor lost in the specimen before me.

Holotype.—Female (Naturhistorisches Museum, Vienna), cotype of *Dacus parallelus* Wiedemann.

Type locality.—Brazil.

Distribution.—Brazil.

Remarks.—Besides the type, this species is known only from a pair in the American Museum of Natural History, collected at Chapada, Brazil, which I believe belong to this species. The foregoing description is based upon these latter specimens. The species agrees very closely with *hamata* save for the distinctly shorter ovipositor. The male has lost most of its abdomen.

10. *Lucumaphila hamata* (Loew), n. comb.

Trypeta hamata Loew, Smithsonian Misc. Coll. No. 256: 229, pl. 11, fig. 22, 1873.

Anastrepha hamata (Loew), Bezzi, Boll. Lab. Zool. Gen. Agr. Portici 3: 284, 1909.—Hendel, Abh. Ber. Zool. Anthr.-Ethn. Mus. Dresden 14(3): 14, 1914.—Greene, Proc. Ent. Soc. Washington 36: 157, pl. 2, fig. 3, 1934.—Costa Lima, Mem. Inst. Oswaldo Cruz 28: 524; O Campo 8: 38, 1937.

Large, yellow-brown. Mesonotum 4.5–4.8 mm long. Thorax yellow-brown, slightly darker just anterior to scutoscutellar suture; metanotum not or little darkened laterally. Macrochaetae orange-brown; pile yellowish brown. Sternopleural bristle very weak or absent. Wing (Fig. 13) 9.8–11.2 mm long; costal and **S**-bands joined for a short distance along vein R_{2+3} ; proximal arm of **V**-band rather narrowly joined anteriorly to **S**-band; distal arm more or less reduced, often confined to a small streak near hind margin, but occasionally narrowly connected to proximal arm. *Female*: Ovipositor sheath 6–7.25 mm long, slender, the spiracles 1.22 to 1.44 mm from base. Ovipositor 5.2–6 mm long, very slender, the shaft about 0.026 mm in diameter, the tip slightly expanded, serrate as in Fig. 6. *Male*: Claspers stout, the apex blunt in lateral view; cephalic view as in Fig. 9.

Cotypes.—Male and female (location unknown).

Type locality.—Brazil.

Distribution.—Brazil and Panama.

Remarks.—The above description is based upon six specimens in the United States National Museum which appear to belong to this species. The data for these specimens are as follows: Brazil (Compere); Amazon River, Arary to Manaus, Brazil, September 20–21, 30 (Holt, Blake, and Agostini); Barro Colorado Island, Canal Zone, September 17, 1937 (Zetek); La Campana, Panama, November 1937 (Zetek); Balboa, Canal Zone, June 1938 (Zetek).

11. *Lucumaphila acidusa* (Walker), n. comb.

Trypeta acidusa Walker, List of the specimens of dipterous insects in the collection of the British Museum 4: 1014, 1849.

Anastrepha acidusa (Walker), Aldrich, Smithsonian Misc. Coll. No. 1444: 602, 1905 (part).—Costa Lima, Mem. Inst. Oswaldo Cruz 28: 530 and 604, 1934.

I have not positively recognized this species. The type has lost a portion of the ovipositor sheath and ovipositor so that the length of these and the

character of the rasper are unknown. Dr. Smart has mounted the remnants of the ovipositor sheath and ovipositor and sent photographs to me. The shaft of the ovipositor is about 0.021 mm wide and this extreme slenderness combined with the general appearance makes assignment to this genus quite certain. The species would run to *hamata* in the key and seems to agree in every particular save that the V-band is complete, a condition unusual in *hamata*. Dr. Smart also photographed the wing of the type (Fig. 16). The pattern of the missing portion is indicated by stippling as it appears on the opposite wing.

Holotype.—Female (British Museum).

Type locality.—Jamaica.

Remarks.—It is to be hoped that the species can again be collected in Jamaica so that it can be more fully described. The name *Anastrepha acidusa* has been used a number of times for the species that Sein described as *A. mombinpraeoptans*, and the Florida record mentioned by Aldrich is probably this latter species. *A. mombinpraeoptans* has an unusually short ovipositor and in a number of other respects is quite different from the species described by Walker.

PROCEEDINGS OF THE ACADEMY AND
AFFILIATED SOCIETIES
GEOLOGICAL SOCIETY

566TH MEETING

The 566th meeting was held at the Cosmos Club, November 9, 1938, President H. D. MISER presiding.

Program: E. B. ECKEL: *Abutment problems at Zuni dam, New Mexico*.—The Zuni dam is an outstanding example of the fact that no dam can be better than its natural foundations. It is built in a narrow gorge that has been cut through a 30-foot basalt flow and into underlying alluvium. A bed of loose sand lies between the base of the flow and a layer of tough clay. The abutments have caused trouble ever since the reservoir was first filled. The most serious difficulties occurred in 1909 and 1936, when large leaks broke out on the south abutment. Both resulted in cracking and settlement of the lava cap and loss of reservoir water. A cut-off wall, built after the first break, was effective for 27 years. The leaks were caused when water entered openings in the basalt and reached the sand layer. This layer acted like a broad, flat pipe and led the water to an outlet below the dam. The sand was flushed out, allowing the spillway and abutment to settle. After the 1936 break, a combination dike and blanket was laid along the south abutment in order to prevent entrance of water into the basalt. The new structure has been tested only for a short time but will apparently be effective. Several geologic problems involved in the repair work were discussed by the speaker.

C. P. ROSS: *Some comments on the geology of quicksilver*.—Quicksilver deposits are widely distributed but so irregular and individually small that it is difficult to prospect for them or to block out ore in advance. Even more than other metals, they are deposited far from their original sources and in areas relatively free from commercial deposits of other metals. Most of the production has come from a small percentage of the known lodes. The deposits are localized where structural conditions furnish comparatively